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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/576,278

04/18/2006

Haruhiko Habuta

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EXAMINER

VERDERAME, ANNA L

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/576,278	Applicant(s) HABUTA ET AL.	
	Examiner ANNA L. VERDERAME	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>04/18/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 16-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitaura et al. US 2002/0022105 in view of Uno et al. WO 2004/027770(US 2005/0253210 used as an English language translation) and Yasuda et al. US 6,221,455.

Kitaura et al. 2002/0022105 teaches a single layer optical recording media in figures 1-2 comprising a Te,O,M recording layer 3 and a dielectric layer 2. The dielectric layer can be placed on either side of the recording layer 3(0037). Figure 3 teaches a dual-layer optical recording layer comprising a first information layer 7, a separation layer 8, a second information layer 9 and a protective layer 4. Here at least the first information layer 7 or the second information layer 9 comprises a dielectric layer 2 and a recording layer 3(0038). Media having 2 to six layers can be formed(0027). A four layer medium is shown in figure 7.

The dielectric layer 2 is made of a material having a refractive index not less than 1.5. Examples of materials for the protective layer include ZnS, TiO₂, ZrO₂, Si, SiC, Si₃N₄, GeN or the like as the main component is suitable. Depending on the wavelength and the optical constant of each layer, it is preferable to determine the

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thickness to be in the range between $0.31\lambda/n$ and $0.5\lambda/n$ where λ is a wavelength of an optical beam used for recording and reproduction is λ and a refractive index of the dielectric layer 2 is n (0040).

The wavelength used for recording is not more than 500 nm(0028). N is preferably 2.5 or more(0040). If a wavelength of 400 nm is used for recording and the refractive index of the protective layer is 2.5 then the minimum thickness for the recording layer $0.31\lambda/n$ is 48 nm and within the range taught in claim 6.

As the material for the recording layer a material containing Te, O, and M wherein M is one or more elements selected from Al, Si, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, Zr, Nb, Mo, Ru, Rh, Pd, Ag, In, Sn, Sb, Hf, Ta, W, Re, Os, Ir, Pt, Au, and Bi can be used. It is preferable that M is Pd or Au since a sufficient crystallization speed and high environmental stability can be obtained(0041). A preferable composition range for the recording layer 3 is from 25 to 60 atomic percent for O-atoms and from 1 to 35 atomic percent M-atom(0042). The recording layer has a thickness in the range of 5 nm to 70 nm(0029).

The reference discusses the results caused by adjusting the O-atom concentration and the M-atom concentration respectively (0043-0044). In an area where the O-atom in the recording layer is contained in an amount of 25 atomic percent or less a thermal conductivity of the layer is too high so that recording marks become too large. Thus even if the recording power is enhanced the C/N ratio does not rise. On the other hand in an area where the O-atom concentration in the recording layer exceeds 60 atomic percent, a thermal conductivity of the recording layer becomes too

low so that recording marks cannot be formed large enough even by enhancing the recording power. Thus the C/N ratio is low and the sensitivity also is insufficient(0043). In an area where M-atom in the recording layer 3 is contained at less than 1 atomic percent the function of promoting crystal growth is low and the crystallization speed in the recording layer is insufficient so that marks can not be formed at a high recording speed. On the other hand in an area where the M-atom concentration exceeds 35 atomic percent a reflectance change between the amorphous and the crystalline phase deteriorates so that the C/N ratio is low(0044).

In regard to the limitation of instant claim 15 which requires annealing of the recording layer at a temperature of 60°C or higher for at least five minutes after the recording layer had been formed, this limitation is taught in Kitaura et al at (0013).

Uno et al. teaches a multi-stack optical recording medium like that shown in table 1. Thicknesses for the protective layers and the recording layers of each recording stack are disclosed in table 1. The thicknesses of the recording layers and the protective layers are within the ranges recited in the instant claims. The fourth recording stack has a 40 nm reflective layer [(WO pages 24—25)/(US 0075)]. The recording layer contain Te-O-Pd [(WO page 22 lines 1-10)/(US 0072)]. The reflective layer is Al-Cr [(WO page 22 line 17)/(US 0074)].

Yasuda et al. teaches a multi-layer optical recording medium wherein preferred materials for the recording layer include TeO_x where $0 < x < 2$ whose relative stability in

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the crystalline state and is favorable in securing thermal stability of the recording pit(10/10-13).

The reference further teaches that in a multi-layered disc the first information layer is made of a material having a higher transmittance(lower reflectance) so that sufficient light is able to access the second and subsequent recording layers(8/28-43). Layers nearer the light incident plane must exhibit sufficient reflectance as well as sufficient transmittance. Layers lying remoter to the light incidence plane must have high reflectance and high absorbancy to enable sufficiently high playback signal amplitude from the recording pit(10/32-63).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the multi-layer information recording media taught by Kitaura et al. by forming the dielectric layers to have a thickness in the range of between 3nm to 50 nm as recited in instant claim 21 and to form an Al-Cr reflective layer in the recording layer furthest from the light incidence plane based on the disclosure in Kitaura et al. at 0028 and 0040 and based on the example of Uno et al. Further, it would have been obvious to one of ordinary skill in the art to modify the multi-layer recording medium by adjusting the amount of metal added to each of the recording films within the acceptable range of 1 to 35 atomic percent M-atom recited in Kitaura et al. so that the recording layer closest to the light incidence plane are more transmissive than those further from the light incident plane based on the teachings found in Yasuda et al. and with the reasonable expectation of forming an optical recording medium in which the recording sensitivity is increased due to the addition of metal and in which recording layers further

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from the light incident plane are accessible. One way this can be achieved is by having the metal content (and a result the reflectivity) of the layers further from the light incidence plane be greater than the content found in those nearer the light incidence plane.

The experimental modification of this prior art in order to ascertain optimum operating conditions fails to render applicants' claims patentable in absence of unexpected results. In re Aller, 105 USPQ 233. One of ordinary skill in the art would have been motivated to adjust the amounts of metal in each of the recording films within the recited range of Kitaura et al. and further would have been motivated to adjust the transmittance and reflectivities of the recording layers in such a way that the reflectivity of layers nearer to the light incidence plane is less than that of layer further from the light incidence plane based on the disclosure in Yasuda. Effects of adding metal to the Te-O film are taught in Kitaura(0043-0044). It is further the position of the examiner that another result of adding more metal or less metal to a material such as the Te-O film is a subsequent increase (more metal) or decrease(less metal) in reflectivity. A prima facie case of obviousness may be rebutted, however, where the results of the optimizing variable which is known to be result-effective, are unexpectedly good In re Boesch and Slaney 205 USPQ 215.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANNA L. VERDERAME whose telephone number is (571)272-6420. The examiner can normally be reached on M-F 8A-4:30P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on (571)272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Anna L Verderame/
Examiner, Art Unit 1795

/Mark F. Huff/
Supervisory Patent Examiner, Art Unit 1795